

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 4-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tubel (U.S. Patent Application Publication US 2003/0094281 A1) in view of Varasi et al. (U.S. Patent US 5,493,390).

Regarding claims 1 and 16, discloses a railway monitoring system (fig. 5), comprising:

an optical fiber (fig. 5, fiber 30), wherein a first part of the fiber is attachable to one of a pair of tracks of a rail, and wherein a characteristic of the first part of the fiber is variable in correspondence to variance of a characteristic of said one track where the first part of fiber is attached;

an optical signal emitter (fig. 5, 18a) connected to the fiber for emitting an optical signal into the fiber, wherein the fiber generates at least a first altered optical signal, which contains information relating to the variance of the characteristic of the part of the fiber; and

an optical signal analyzer (fig. 5, 18b) connected to the fiber for receiving and analyzing the first altered optical signal so as to ascertain the variance of said

Art Unit: 2613

characteristic of said one track based upon the information contained in the first altered optical signal;

wherein both the emitter and the analyzer are connected to an end of the fiber;

wherein the first altered optical signal is a signal reflected by the fiber towards said end (fig. 5).

Tubel differs from the claimed invention in that Tubel does not specifically disclose that the first part of the fiber includes a first Bragg grating created therein for generating the first reflected optical signal, wherein a characteristic of the first Bragg grating is variable in correspondence to the variance of said characteristic of said one track, and wherein the first reflected optical signal contains information relating to the variance of the characteristic of the first Bragg grating. However, Tubel discloses that the fiber sensor can be a Bragg grating (paragraph 0077). Furthermore, it is well known in the art to make sensors utilize Bragg gratings to be embedded or embedded to structures to measure parameters like strain and temperature. For example, Varasi specifically discloses optical sensors utilize Bragg gratings to be embedded or embedded to structures to measure parameters like strain and temperature (abstract, figs. 1-10). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate Bragg grating sensors of Varasi, in the system of Tubel. The motivation would have been to utilize of modular sensors to provide in service monitoring of structures and components of railway (Varasi: column 8, lines 30-52).

Art Unit: 2613

Regarding claim 4, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose that the first Bragg grating is pre-strained in a direction at least substantially parallel to said one track. However, Examiner takes Official Notice that it is well known in the art to pre-strain a Bragg grating utilized in a sensing device. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate to pre-strained the Bragg grating in the system of Tubel and Varasi in a direction at least substantially parallel to said one track. The motivation would have been to increase the detection sensitivity.

Regarding claim 5, the characteristic of the first Bragg grating in the modified system of Tubel and Varasi relates to a grating period of the first Bragg grating, and wherein the grating period is variable in correspondence to a change in a tensile strain that the first Bragg grating experiences (Varasi: figs. 1-10).

Regarding claim 6, Tubel and Varasi discloses that the first Bragg grating is attached to said one track such that the first Bragg grating experiences a same tensile strain as said one track (note that Tubel and Varasi disclose to bond the sensor to the measured structure, allowing the measurement of parameters like strain).

Regarding claim 7, Varasi discloses that the optical signal analyzer detects a shift in a wavelength of the first reflected optical signal for ascertaining the variance of the characteristic of the first Bragg grating (figs. 1-10).

Regarding claims 8-12, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose the specific ways

Art Unit: 2613

of analyzing the measured data. However, the cited limitations are only trivial data analysis that is within the grasp of one of ordinary skill in the art. In addition, the cited limitations do not limit the system to any particular structures.

Regarding claim 13, Varasi further discloses that the system comprising a second Bragg grating.

Regarding claims 14 and 15, the modified system of Tubel and Varasi differs from the claimed invention in that Tubel and Varasi do not specifically disclose the specific ways of analyzing the measured data. However, the cited limitations only relate to trivial data analysis that is within the grasp of one of ordinary skill in the art. In addition, the cited limitations do not limit the system to any particular structures.

Regarding claim 17, Tubel further discloses that the information relates to train or vehicle on said rail (fig. 5).

### ***Response to Arguments***

3. Applicant's arguments filed on 2/ 4/2010 have been considered but are moot in view of the new ground(s) of rejection.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to QUAN-ZHEN WANG whose telephone number is (571)272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

Art Unit: 2613

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

5/5/2010

/Quan-Zhen Wang/

Primary Examiner, Art Unit 2613